

*A Journal of Cold-Blooded
Vertebrates*

ESTABLISHED IN 1913

OCTOBER-DECEMBER

No. 165

DECEMBER 23, 1927

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Published Quarterly by the American Society of Ichthyologists and Herpetologists at Burton Hall, Northampton, Mass. Entered as second-class matter Feb. 11, 1924, at the post office at Northampton, Mass., under the Act of Aug. 24, 1912. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of Oct. 3, 1917, authorized Feb. 11, 1924.

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FISHES FROM OCRACOKE, NORTH CAROLINA

During the summer of 1926, Mr. Charles M. B. Cadwalader obtained a few fishes at the above locality.

Synodus foetens. One example.

Syngnathus fuscus. Two.

Orthopristis chrysopterus. One.

Leptecheneis naucrates. Adult, disk with 23 plates.

Gobius encaecomus Jordan & Gilbert. One example, 44 mm. long.

Chasmodes bosquianus. One example.

I may also note the following fishes from bird stomachs, submitted by Mr. Wharton Huber:

Anguilla rostrata. One 10 inches long, from the gullet of a Red-breasted Merganser killed at Currituck, N. C., in the fall of 1924.

Cyprinodon variegatus and *Gambusia affinis*. Of the former 8 and the latter 9, all found in a Green-winged Teal killed at Santee, S. C., on Jan. 15, 1927.

Pomatomus saltatrix. One 6½ inches long taken from a Royal Tern killed at Ocracoke on Dec. 11, 1925.

HENRY W. FOWLER

Philadelphia, Pa.

NOTES ON FISHES

AT CHINCOTEAGUE, VIRGINIA, 1926

Mr. W. J. Fox reported the following May 28 to 31 and October 7 to 9.

Carcharias taurus. Several small ones in the fall.

Mustelus canis. Abundant.

Raja eglanteria. Abundant.

Dasyatis say. Adult obtained in spring.

Megalops atlanticus. Mr. R. Dale Benson Jr. reports one taken on a line, weight 4 pounds, July 20.

Pomolobus mediocris. Several in the fall.

Brevoortia tyrannis. Common in the pounds.

Anguilla rostrata. Frequent.

Scomberomorus maculatus. One in the spring.
Poronotus triacanthus. Common.
Morone americana. Eight in the fall.
Centropristes striatus. Frequent, 6 in the fall.
Orthopristis chrysopterus. Several in the fall.
Stenotomus chrysops. Frequent in May.
Cynoscion regalis. Frequent, one of 7 pounds in the fall.
Bairdiella chrysura. Frequent in the fall.
Sciaenops ocellatus. Plentiful at lower end of island in the fall.
Leiostomus xanthurus. Frequent in the fall.
Micropogon undulatus. Usually large in the spring, only one in the fall.
Menticirrhus saxatilis. Frequent.
Paralichthys dentatus. Frequent during the fall.
Opsanus tau. Several.

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NOTES ON FISHES IN DELAWARE, 1925-26

Mr. Victor Grillet obtained several small collections during June in the Christiana Creek basin below Wilmington, Red Lion Creek, Murderkill Neck in a small branch of the Murderkill River, Frederica, tributary of the Mispillion River at Milford, Indian River headwaters, Broad Kiln Creek at Milton. Mr. W. J. Fox also gave me some notes made at Bowers Beach, August 29-30 and September 19, 1925.

Mustelus canis. Bowers Beach, 1 August and 1 September.

Sphyrna zygaena. Small one at Bowers Beach in September 1926 found by Mr. W. A. Biedermann.

Raja eglanteria. Two at Bowers Beach in September.

Abramis crysoleucas. Milford and Indian River headwaters.

Umbra pygmaea. Murderkill Neck, Frederica, Indian River headwaters, Milton.

Esox americanus. Murderkill Neck.

Esox tridecemlineatus. Christiana Creek, Murderkill Neck, Frederica, Milford, Indian River headwaters, Milton.

Fundulus luciae. Murderkill Neck, Frederica, Milford, Indian River headwaters, Milton.

Gambusia affinis. Red Lion Creek, Murderkill Neck, Milford, Indian River headwaters, Milton.

Aphredoderus sayanus. Murderkill Neck, Frederica, Milford, Indian River headwaters, Milton.

Pomatomus saltatrix. Bowers Beach, small one in August in September, also large one in September.

Enneacanthus gloriosus. Christiana Creek, Red Lion Creek, Murderkill Neck, Frederica, Milford, Indian River headwaters, Milton.

Pomotis gibbosus. Murderkill Neck and Indian River headwaters.

Micropterus salmoides. Near Georgetown by Mr. Grillet.

Centropristes striatus. Small. This and the following all from Bowers.

Cynoscion regalis. Common, one of 10 pounds.

Bairdiella chrysura. Common, several large.

Leiostomus xanthurus. Abundant.

Micropogon undulatus. Rather few and small.

Pogonias cromis. Five from 15 to 35 pounds.

Paralichthys dentatus. One with pale spots.

HENRY W. FOWLER

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NOTE ON *EXALLIAS OBSCURUS* BORODIN

In American Museum Novitates, No. 281, Sept. 12, 1927, pp. 1-2, Prof. N. A. Borodin describes under the above name a blenny 120 mm. long from Ohau. This is surely the same as an example I reported in 1923 from Honolulu, obtained in 1916, as *Cirripectes alboapicalis*, having identified it with *Salarias alboapicalis* Ogilby 1898 from Lord Howe Island and later obtained at the New Hebrides. In my example, which

is 152 mm. long, the upper of the first dorsal anteriorly is reddish instead of whitish, as shown in McCulloch and McNeill's figure of a Lord Howe example. Borodin's fish is only different in its uniform color and I believe it simply a variant, possibly a usual type of coloration found among younger specimens. *Exallias obscurus* Borodin may now rest as a synonym of *Cirripectes alboapicalis* (Ogilby).

Philadelphia, Pa.

HENRY W. FOWLER

SUPPLEMENTARY NOTE ON THE BAHAMA TOP MINNOW

In this journal, No. 164, July-September, 1927, (pp. 61-65), I have recently described a new species of poeciliid fish from the Bahamas, naming it *Gambusia manni*. Since this article was set up by the printer, I examined some additional examples of the species, listed under other names, in the collections of the United States National Museum. These specimens fully correspond with the type description. They came from Green Turtle Cay (collected by a Johns Hopkins party) and from San Salvador (Bartsch). These specimens from the last named locality include males showing the characteristic *puncticulata*-type of gonopodial structure, and are of further interest in that they confirm my reference of Bean's *Gambusia affinis* record from the same island (Watling's=San Salvador) to *G. manni*. Rosén's specimens were from a brackish pond on Andros. It is now evident that *Gambusia manni* is of general distribution in brackish and fresh water ponds through the northern half of the Bahamas.

In the original account I misspelled the name of the collector of the types, Mr. Stephen Haweis.

CARL L. HUBBS

Museum of Zoology,
University of Michigan,
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NAMES OF FISHES TOO LONG AND COMPLICATED

A record beating instance of a very complicated and long name given to a fish is the following, introduced by Mr. A. Rabinerson. Namely a herring race found by him in Cheshkaya Bay (Glacial Ocean), named *Clupea harengus pallasii Suvorovi natio nova* Rabinerson (see "Transactions of the Institute for Scientific Exploration of the North, No. 34, Expedition of 1925 in the Cheshkaya Bay, under E. K. Suvorov, Moscow, 1927. Russian with English resume, pp. 66 and 87).

It is well known that one and the same species can have several subspecies or varieties and races, as has been clearly shown by Dr. Heincke in herrings; but they all are varieties and races of one and the same genus *Clupea* and of the species *harengus*. For simplicity and clearness sake, I think it would be more convenient to consider all these slight variations as local races than to apply for them a new full name, consisting of five words.

Variety, subspecies and local races are subdivisions, generally accepted. *Natio*, a word borrowed from Anthropology, is rather uncommon and I think, hardly desirable to be introduced in Ichthyology.

On the other hand I do not find it proper to attribute to a race which evidently originated from peculiar local conditions the names related to any person as is the case with the *nova natio* of Mr. Rabinerson, who dedicated it to Mr. Suvorov, the head of the expedition. I think that the race must be named simply by the name of the locality where it had been found—in that particular case Cheshkaya Bay.

N. BORODIN

New York City.

THE SUEZ CANAL AS A MEANS IN THE DISPERSAL OF MARINE FISHES

The remarkable distinctness of the fish faunas of the Mediterranean and Red Seas has been commented upon by almost every one dealing with geographical distribution of marine fishes. This difference is in part being slowly broken down, for certain species have been able to pass through the Suez Canal, including the bitter lakes in its course, to reach the sea on the opposite side of the isthmus. This dispersal phenomenon has recently been studied by Norman, who has just published his detailed report.¹ In this paper, the author has summarized previous contributions on the subject, as well as listing a large amount of new information.

It is a matter of importance that this account by Norman should be supplemented whenever new information of a pertinent nature has been brought to light. I therefore call attention to another probable case of the penetration of a Red Sea species into the Mediterranean through the Suez Canal. A young specimen of *Trachinotus*, apparently referable to *T. ovatus* (Linnaeus) was secured by Arthur Loveridge, at the "banks of the Suez Canal, Port Said," on March 14, 1909. This species has been recorded from various localities in the Indo-Pacific realm, but has also been reported by several ichthyologists from the west coast of tropical Africa. It is possible, of course, that this fish may represent a stray from that region rather than a migrant through the Canal.

1. Trans. Zool. Soc. London, 1927, pt. 3, pp. 375-390.

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A NEW LIZARD FROM CHINA

The lizard which I originally recorded as *Leiolepisma laterale* (Mem. M.C.Z., 40, 1912, p. 135) is not really that species at all but proves to be new. Recent collections from China have shown that there are a number of species, in general similar in appearance to our American *L. laterale*, which once was supposed to be spread not only over a large part of North America but to have a wide Asiatic distribution as well. This is now known to be contrary to fact and I am now naming one more element in the confused group. It may be called—

Leiolopisma schmidtii sp. nov.

TYPE: M.C.Z. 7966 from Mt. Washan, western Szechuan, China. Collected by W. R. Zappey, 1908. Given to the Museum by John E. Thayer, Esq.

A rather large *Leiolopisma* in some respects similar to *L. reevesii*, *L. monticola*, *L. septentrionalis* and *L. barbouri* perhaps closest to the latter but differing in color and in the size of the head. Body elongate, limbs failing to meet by just about the length of the hand; digits 5; head not wider than neck, a rather small undivided, transparent shield in the lower eyelid; ear opening about as large as eye opening; without denticles; dorsal scales smooth, about as large as ventrals, in 26 rows; praenals enlarged; anterior loreal slightly smaller than 2nd; four large and one very small supraoculars; the adpressed fore limb reaches almost to the eye; 11 lamellae beneath the 4th toe; tail once and nine tenths times as long as head and body; the length of head contained a little less than eight times in the distance from snout to vent.

COLOR: Back ruddy brown, a dark sooty area on each side sharply defined above but fading below to the yellowish belly; tail ruddy brown above, dusky on sides, spotted with black on pale yellow below.

This new species is named in honor of Mr. K. P. Schmidt who has kindly examined this specimen during a recent visit to the Museum.

*Mus. Comp. Zoöl.
Cambridge, Mass.*

THOMAS BARBOUR

CAUPHIAS REDISCOVERED

Mr. A. W. Anthony has been for some time collecting reptiles and amphibians, in Guatemala, for the Museum of Comparative Zoölogy. In his last shipment from Panajachel, near Lake Atitlan, there was a most interesting frog which I did not at first recognize at all but which later I concluded really represented what Boulenger and Gunther had called *Hyla guatemalensis* and which was originally set up by Brocchi as the type of his genus *Cauphias*. This is apparently the second known specimen and since the genus is a perfectly valid one it may be worth while to put these notes on record.

I have to thank Mr. Remington Kellogg not only for confirming my identification but for calling my attention to the peculiar vestigial pollux. When I dissected the sternum I was at once struck by its similarity to Noble's figures of transitional types between arciferal and firmisternal forms. The *Cauphias* sternum recalls some of his figures for *Sminthillus* and *Eleutherodactylus*. This genus is probably most closely related to the latter and has probably become highly modified to meet some peculiar environmental condition or on account of some specialized habits as yet unknown.

Cauphias Brocchi

1877. *Cauphias* Brocchi, Bull. Soc. Philom. de Paris, (7), tome 1, Nos. 3, p. 129. (Genotype, *Plectrohyla guatemalensis*, p. 129).

Cauphias guatemalensis (Brocchi)

1877. *Plectrohyla guatemalensis* Brocchi, Bull. Soc. Philom. de Paris (7), tome 1, No. 2, p. 93.

1877. *Cauphias guatemalensis* Brocchi, Bull. Soc. Philom. de Paris (7), tome 1, No. 3, p. 129.

1882. *Hyla guatemalensis* Boulenger, Cat. Batr. Sal. Brit. Mus., ed. 2, p. 396.

1882. *Cauphias guatemalensis* Brocchi in: Miss. Sci.

au Mexique et dans l'Amer. Centrale, pt. 3, sec. 2,
p. 62, pl. 12, figs. 3, 3a-c.

1901. *Hyla guatemalensis* Günther, Biol. Centr. Amer.,
Rept. & Batr. p. 281.

1923. *Hyla guatemalensis* Nieden, "Das Tierreich,"
Anura I, p. 250.

TYPE LOCALITY—Pacicilla, Guatemala.

REFERRED SPECIMEN—Panajachel, near Sololá, Lake
Atitlan; alt. about 4500 ft., mountains of Guatemala;
M.C.Z. No. 11150, Sept. 28, 1926; A. W. Anthony;
Museum of Comparative Zoölogy.

DESCRIPTION—The teeth are in two transverse clusters of 4 to 6 teeth each behind, but within the level of the inner margins of choanae. There is no external indication of tympanum. The first finger has a well developed claw-like vertige of pollex buried in a fleshy apophysis, which has the appearance of arising from the side of the thumb, giving a peculiar bifid appearance to that digit. Fingers II, III, IV are slightly webbed at the base; the apical discs are rounded, but well developed. There is a small spur-like spine on the inner edge of the first finger. The toes are fully webbed, slightly scalloped, and the internal metatarsal tubercle is very small and minute. A strong well developed tarsal fold extends the full length of the tarsus. Indistinct articular tubercles extend backward on the inferior surfaces of the metacarpals and metatarsals. The hind limb being carried forward along the side of the body, the tibiotarsal articulation reaches the posterior margin of the eye. The canthus rostralis is distinct, fairly sharp and loreal region sub-vertical. The skin of the upper parts, top of head, upper surfaces of fore and hind limbs have scattered spinose tubercles while the throat and underparts and under surface of the thighs are coarsely granular. The specimen has a slight skin fold across the chest and is apparently without abdominal disc. There is a longitudinal thick dermal fold from

the posterior margin of the eye to above the insertion of the fore limb.

COLOR—The upper parts are uniformly bluish slate. The under parts have a slight diffusion of pinkish but marbled with darker on throat.

Mus. Comp. Zool.
Cambridge, Mass.

THOMAS BARBOUR

FIELD NOTES
ON SOME AMPHIBIANS AND REPTILES
AT BILOXI, MISSISSIPPI

In 1921 the writer spent some time at Biloxi, Miss., and nearby points. A number of field studies of birds (Corrington, 1922) were supplemented by a few scattered observations of amphibians and reptiles, occurring between the dates of January 17 and April 8, and while neither the season nor personal opportunity permitted any attempt to secure complete notes or to perform intensive field investigations, it seems desirable to place the following items on record. This is especially true in view of the richness of the fauna and flora of the Mississippi Coast, and the fact that so few studies have been made of this region.

The city of Biloxi lies at the tip of a long and slender peninsula, washed by the Mississippi Sound on the south and by the Biloxi Back Bay on the north. The residential and business section fronts the Sound while the plants of the canning industry are located along Back Bay. The immediate environs include the cemetery and golf links as accessible and prolific collecting grounds, and are elsewhere heavily wooded with deciduous trees, the live oak predominating, and with scatterings of pines. Small wooded swamps occur here and there, and a multitude of tiny marshes are met with on every hand, freshwater to the north and saltwater to the south. Northward, across Back Bay, lies a fertile farming region, the clearings separated by large pineries and an occasional river or swamp. At the confluence of Bay and Sound and just off the

mainland is Deer Island, containing pine groves and a large interior marsh, while Ship Island, twelve miles from shore, is largely a bare sand spit but has a lagoon and some pines and marshes at its eastern tip. The great Pascagoula Swamp is situated about forty miles eastward and is one of the few major swamps of the United States where virgin conditions still prevail, and the writer could but regret his inability to devote more time or penetrate farther into this area, where the Ivory-billed Woodpecker, Wild Turkey, Deer, Bear, and Alligator still maintain a foothold.

Out of a possibility of some 106 species which should occur in the coastal counties of Mississippi, but 26 were recorded, whereas Brimley (1910) lists 38 from the Bay St. Louis region, the city of that name lying thirty miles to the west of Biloxi. These specimens were purchased by Brimley and shipped to him alive by a collector not mentioned.

In the following list the 20 forms noted at Biloxi which also appear in Brimley's paper are marked with an asterik (*).

**Plethodon glutinosus*, Slimy Salamander. 2, Feb. 16, Back Bay, under fallen log in small swamp; 3, Mch. 3, Belmar, in a similar situation.

**Desmognathus fuscus auriculatus*, Southern Dusky Salamander. Commonly taken from under logs and in open water in all swamps. Apparently active all winter.

Bufo americanus, American Toad. 2, Feb. 16, Back Bay; 1, Mch. 15, Back Bay; 1, Apr. 2, Golf Links; 2, Apr. 5, Pascagoula Swamp. Apparently not abroad during the winter since spring begins in this country about the middle of February.

**Acris gryllus*, Cricket Frog. Abundant in nearly all localities, including Deer Island. Active and calling all winter.

**Hyla cinerea cinerea*, Green Tree Frog. One drowsy specimen taken from beneath the loose bark

of a standing dead tree on Deer Island, Jan. 31.

**Hyla squirella*, Southern Tree Frog. Several captured at the same time and place as *H. cinerea*, and in a very torpid condition.

**Rana pipiens*, Leopard Frog. 1, Feb. 16, Back Bay; 2, Mch. 3, Belmar; 5, Mch. 29, Heartsease.

**Alligator mississippiensis*, Alligator. 2, Apr. 5, seen swimming in the bayous of Pascagoula Swamp, where they are reported to be quite common.

**Anolis carolinensis*, American Chameleon. Very abundant throughout the region, especially along the walls and fences fronting the beaches. Over 200 individuals noted during my 82 day sojourn.

Sceloporus undulatus, Pine Lizard. Less common than the preceding and more often found in the woods and remoter districts. 22 recorded, Feb. 13 to Apr. 2.

**Ophisaurus ventralis*, Glass Snake. Common. The Biloxi Cemetery proved to be the best collecting ground for this species, 5 being taken there on Apr. 1, and 1 on Apr. 8. The Back Bay waste fields yielded 1 on Feb. 16, and 2 on Apr. 6.

Cnemidophorus sexlineatus, Six-lined Racer. Commonly noted at Heartsease on Mch. 29, but not elsewhere observed.

Leiolopisma laterale, Ground Lizard. Common. 10 collected, including 2 from Deer Island, Jan. 18 to Mch. 3.

**Eumeces fasciatus*, Five-lined Skink. Abundant. 22 taken from various mainland districts, especially the Cemetery and Golf Links, and noted as abundant also in the Pascagoula Swamp. Earliest appearance, Feb. 16.

**Diadophis punctatus stictogenys*, Ring-necked Snake. 1, Feb. 21, Back Bay; 1, Feb. 22, Soldier's Home; 1, Mch. 3, Belmar; all from under the loose bark of fallen pine trunks.

**Coluber constrictor constrictor*, Blacksnake. 1, Apr. 1, Cemetery; 1, Apr. 2, Gold Links; 1, Apr. 4, Pascagoula Swamp.

**Elaphe guttata*, Corn Snake. 1, Feb. 16, Back Bay; 1, Apr. 3, Ocean Springs.

**Lampropeltis getulus holbrooki*, Speckled Kingsnake. One very tame adult was captured Mch. 2 at Belmar, along the grassy border of a lagoon, and kept as a pet until leaving Biloxi, Apr. 8.

**Cemophora coccinea*, Scarlet Snake. 1, Apr. 1, Cemetery; cryptozoic.

Natrix cyclopion, Green Watersnake. 1, Mch. 15, Woolmarket.

**Natrix sipedon fasciatus*, Southern Banded Water-snake. Several observed in the streams of the Back Bay and Woolmarket areas, but none collected. First appearance Feb. 21.

**Storeria dekayi*, DeKay's Snake. 1, Feb. 10; 1, Mch. 22; both cryptozoic in back yard debris of city houses.

**Potamophis striatulus*, Brown Snake. 2, Feb. 21, Back Bay, cryptozoic.

**Agkistrodon piscivorus*, Water Moccasin. 1, Feb. 26, Ship Island; 2, Mch. 15, Woolmarket; 1, Apr. 1, Cemetery; 1, Apr. 2, Gold Links; 3, Apr. 4, Pascagoula Swamp. A widely distributed and ubiquitous snake.

**Kinosternon subrubrum*, Common Mud Turtle. 1, Jan. 17, Back Bay; 2, Feb. 16, Back Bay; 1, Mch. 3, Belmar. Subspecies not determined.

Amyda ferox, Southern Soft shelled Turtle. Two adult specimens were shipped to the writer in May, after leaving Biloxi, by Mr. John Hord. The species is reported to be common in all rivers of the region, and especially in the Pascagoula Swamp.

[I have recorded (Dunn, 1906, Plethodontidae) *Pseudotriton montanus flavissimus*, and *Eurycea quadridigitata quadridigitata* from Biloxi, E. R. D.]

For convenience of reference on the herpetology of the Mississippi Coast, the additional 18 species listed by Brimley for Bay St. Louis, and not recorded by the writer at Biloxi, are here appended.

Triturus viridescens viridescens, Common Newt.
Ambystoma talpoideum, Mole Salamander.
Eurycea gutto-lineata, Holbrook's Triton.
Bufo terrestris, Southern Toad.
Pseudacris nigrita, Rough Chorus Frog.
Pseudacris occidentalis, Smooth Chorus Frog.
Hyla gratiosa, Georgia Tree Frog.
Hyla versicolor, Common Tree Frog.
Gastrophryne carolinensis, Narrow-mouthed Toad.
Heterodon contortrix, Common Hog-nosed Snake.
Opheodrys aestivus, Rough Green Snake.
Leimadophis flavilatus, Brown-headed Snake.
Lampropeltis triangulum amaura, Red Milk Snake.
Virginia elegans, Elegant Snake.
Thamnophis sackenii, Florida Ribbon Snake.
Tantilla coronata, Crowned Snake.
Sistrurus miliarius, Ground Rattlesnake.
Terrapene carolina triunguis, Three-toed Box Turtle.

LITERATURE CITED

Brimley, C. S., 1910, Records of some reptiles and batrachians from the southeastern United States. Proc. Biol. Soc. Washington, 23, p. 9-18.
Corrington, J. D., 1922, The Winter Birds of the Biloxi, Mississippi, Region, Auk, 39, p. 530-556.

JULIAN D. CORRINGTON

Zoological Laboratory of the Liberal Arts College of
Syracuse University

ON THE RELATIONSHIPS OF CERTAIN PLETHODONT SALAMANDERS

Dr. G. K. Noble has recently (1927, Amer. Mus. Novitates, No. 249), made a number of observations on the Plethodont salamanders, including some criticisms on my treatment of them in my recent monograph. I take the present opportunity to call attention to one set of these criticisms and observations, which seem to me to be ill-founded, namely certain assertions as to relationships.

Noble states on page 8 that certain species of *Oedipus* undergo a loss of maxillary teeth in the male, and that this character seems to shift over to both sexes in other species. The only evidence for this general statement is the fact that four species (*pennatus*, *rufescens*, *colonneus*, and *alfaroi*) lack maxillary teeth, as far as known at present. Of these four species adult males are known only in *pennatus*, the other three being represented in collections only by females and by young. As far as the related species are concerned the loss of the maxillary teeth from the hind end of the bone seems not at all correlated with sex, males of some species have more fully toothed maxillae than the females, and vice versa, and although few specimens have been examined the lack of such correlation in one form with feeble maxillary dentition (*salvinii*) is sufficient to indicate that Noble's explanation of the loss of maxillary teeth in *Oedipus* is a purely gratuitous assumption, unsupported and even contradicted by the facts.

He further states on page 12 that the elongated premaxillary teeth have appeared, disappeared and reappeared again. Here also the statement is not supported by any known facts. These teeth are present in the *Desmognathus*-*Leurognathus* group; they are found in certain small *Plethodon* and in *Batrachoseps* and *Hemidactylum* which are probably derivatives of small *Plethodon*; they are found in *Eurycea*; and they are found in *Hydromantes*-*Oedipus*, but seem absent in *O. uniformis*, a worm-like species (they are present in *parvipes*, another worm-like form). This character then may be said to have appeared four times in the family. It may also be said to have disappeared once, but there is no evidence whatever of its reappearance.

Both of these remarks are simply expressions of some general theory of sexual dimorphism, which theory the *Plethodontidae* rather disprove than prove.

On page 19 Noble says that *Plethodon intermedius* may be considered a dwarf form of *P. vandykei*, apparently because he considers the sexual dimorphism of the premaxillary teeth to be further advanced in the former species. Now *P. vandykei* is a very peculiar species, possessing certain characters (parotoid glands, quite webbed toes, very short body), which render it an extremely isolated species in the genus, so that there can be no forms derived from it. It is not a large species, (the largest of a series of 28 which I examined having a head and body length of 41 mm.). The premaxillary teeth are more enlarged in U. Mich. 54219 than in any specimen of the 22 *P. intermedius* I examined. The largest of the latter had a head and body length of 65 mm. I fail to see any evidence that *intermedius* is more dwarfed or has more sexual dimorphism than *vandykei*. These characters of the male are highly variable in each species, as examination of a large series will show, and it is quite possible that Noble has seen a male of *intermedius* with longer premaxillary teeth than any male *vandykei* that he has seen, but the value of conclusions based solely on this observation is rather slight.

Noble states, on page 5, that *Eurycea quadridigitata* is allied by its color and its sexual dimorphism to *E. bislineata cirrigera* rather than to *E. gutt-lineata*, the latter having been suggested by me as its ally on the basis of 139 specimens of *gutto-lineata*, 135 of *cirrigera*, and 156 of *quadridigitata* and its race *remifera*. From the specimens I have seen I should be inclined to say that male *quadridigitata* and *gutto-lineata* had more swollen snouts, more elongated premaxillary teeth, and longer narial cirri than *cirrigera*, although I should not place too much emphasis on this alone. Noble has shown that male *gutto-lineata* has more elongated maxillary teeth than the two smaller forms. In color the larvae and adults of *gutto-lineata* and *quadridigitata* normally agree and differ not only

from *cirrigera* but from all other forms of the genus in having (1) marked ventral pigmentation, (2) a light line from arm to leg; (3) a dark mid-dorsal line. These characters of color are not mentioned or called in question by Noble, who does not say wherein *cirrigera* and *quadridigitata* agree in any detail. Until he can refute in detail my detailed statement of resemblances given in my monograph and herein restated I shall maintain my former opinion as to the relationship of *quadridigitata*.

One new bit of evidence on this case has just come to light. This is that eggs were taken near Highlands, N. C., by J.E. Benedict, Jr., on June 4, 1927, "in moist humus on the steep bank adjacent to Bear Wallow Falls, some ten or fifteen yards from the creek. They were lying in a pocket in the humus and were not stalked or attached to anything. I found them two feet from the black and white striped individual [*gutto-lineata*]."—If, as would seem, these are the eggs of *gutto-lineata*, they resemble rather those of *quadridigitata* than those of *bislineata*.

When the young of a species differ in color from the adults, it has usually been assumed that the young show the more primitive coloration; and related species whose adults retain this juvenile coloration are usually assumed to be more primitive species. The cases of the cats, the pigs, the deer, and the thrushes are illustrations of this. Therefore it is somewhat strange for Noble to say, as he does on page 23, that there is no *a priori* reason to think that of the races *Pseudotriton ruber* the most primitive is *nitidus* because it retains the juvenile coloration of *schencki* and of *ruber*. The opposite view, that such forms are specialized, is quite new, and I myself am largely responsible for introducing it into herpetology and it still has to be supported by other evidence, while no apology is usually needed for advancing the generally accepted theory.

In this particular case, the facts are that the mountain races of *ruber*, as well as the mountain form of *Eurycea bislineata*, and of *Gyrinophilus*, show a coloration not only juvenile when compared with their nearest allies outside the mountains, but one which is demonstrably more like that of the other extramontane species of *Eurycea* and of *Pseudotriton*. To consider these mountain races primitive in coloration is therefore exactly the same as to consider the thrushes as more primitive than the robin, rather than to follow Noble's idea and to consider the thrushes as permanently juvenile robins.

E. R. DUNN

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AMPHIBIANS OF UPPER SOUTH CAROLINA

Upper South Carolina is thrust like a wedge between North Carolina and Georgia which states have a common border extending for many miles beyond the westernmost point of South Carolina. This makes the entry, "From Virginia to Georgia," confusing, as a species might range down along the higher mountains without entering South Carolina at all. The last named state is also unique in that it is the only south Atlantic state that empties no water into the Gulf, merely touching the dividing ridge with its northernmost border. So any species found in South Carolina is known at once to range into the Atlantic slope. Some time ago I attempted to gather confirmation for all the species supposed to be found in what is known as upper South Carolina, along and above the fall-line. By far the greatest help I found was the list of specimens from Miss Charlotte Paine, later Mrs. M. E. Daniels, of Anderson. Her work was supplemented by J. R. Nowell who collected reptiles at Portman Dam near the same city, but Dr. John Barratt of Abbeville,—his home is now in Greenwood,—was also a great aid. Their specimens are now in the U. S. National Museum

where I have placed a number of my own. Among later lists none have proved so valuable as that of Mr. E. R. Blake of Greenwood, as it contains a number of more common species others have taken for granted without collecting. That part of Dr. Barratt's splendid work left in the care of a local school has been so neglected as to be quite useless. In giving authorities I have tried to respect priority claims, with due regard to more typical highland localities.

Necturus punctatus, Gibbes' Mudpuppy. Only near coast-plain. From J. D. Corrington, Columbia; v. Copeia No. 161. N. Y. State Museum.

Amphiuma means, Congo Eel. Near coast-plain. S. F. Hildebrand, Hamburg, U.S.N.M.

Cryptobranchus alleganiensis, Hell-binder. 3 specimens from J. P. Barratt in U.S.N.M. are listed from Abbeville. Locality questionable I believe.

Triturus viridescens, Common Newt. 10 specimens from J. P. Barratt, Abbeville, in U.S.N.M.

Ambystoma maculatum, Spotted Salamander. 3 from J. P. Barratt, Abbeville, U.S.N.M.

Ambystoma opacum, Marbled Salamander. Near coast-plain. Dr. Wm. Blanding at Camden; v. Holbrook. Specimens in U.S.N.M. from Abbeville and Anderson.

Ambystoma tigrinum, Tiger Salamander. S. H. Loud, Edgefield. U.S.N.M.

Hemidactylum scutatum, Four-toed Salamander. 1 from Dr. L. R. Gibbes, Abbeville, April, 1844; v. Boston Journal of Natural History. Also from Anderson, U.S.N.M.

Plethodon cinereus, Chestnut-backed Salamander. From J. E. Dekay, Camden, 1842. Also from Wm. Blanding, Camden, according to Holbrook.

Plethodon glutinosus, Slimy Salamander. 5 from Abbeville in U.S.N.M. Also from Calhoun Falls, near Abbeville, in Field Museum.

Gyrinophilus danielsi, Daniel Salamander. 2 from

Greenville in U.S.N.M. Also represented from Abbeville and Columbia. To this same species should be ascribed the *G. porphyriticus*, Salmon Salamander, from M. Cabanis in S. C. mountains; v. Holbrook.

Manculus quadridigitatus quadridigitatus, Dwarf Salamander. Specimen from Abbeville, in U.S.N.M. Also from Columbia in N. Y. State Mus., by J. D. Corrington.

Pseudotriton montanus montanus, Mountain Triton. Specimens in U.S.N.M., from Anderson and Columbia. Also recorded from Abbeville by Cope, 1889.

Pseudotriton ruber, Red Salamander. Coast-plain to crest of mountains. 3 from Mrs. M. E. Daniel, Anderson, U.S.N.M. Others from Columbia, Hamburg, and Little Rich Mountain, U.S.N.M.

Eurycea bislineata cirrigera, Two-lined Salamander. 2 from A. L. Pickens, Greenville and Richmond Burn, U.S.N.M. Here should be recorded older forms from Pendleton, Hamburg, and Abbeville, in Holbrook and U.S.N.M., as *E. bislineata*.

Eurycea gutt-lineata, Holbrook's Salamander. Dr. Geo. (?) Wurdeman, Greenville, to Holbrook. Also from Anderson, Abbeville and Hamburg, in U.S.N.M.

Aneides aeneus, Bronze Salamander. From J. O. Pepper at Mt. Pinnacle; v. Copeia, No. 162.

Desmognathus fuscus fuscus, Dusky Salamander. 10 from Prof. S. F. Baird, Abbeville, U.S.N.M. Others from Columbia, Anderson, and Greenville, in U.S.N.M.

Desmognathus fuscus auriculatus, Eared Salamander. From S. F. Hildebrand, Hamburg, U.S.N.M., Nos. 61235-6. Coastal plain form that may reach extreme lower Piedmont.

Desmognathus phoca, Seal Salamander. 2 from A. L. Pickens, Greenville, U.S.N.M.

Desmognathus quadra-maculatus, Black Salamander. 3 from J. P. Barratt, Abbeville, in U.S.N.M. Also from Little Rich Mountain by A. L. Pickens, U.S.N.M.

Siren lacertina, Mud Eel. From E. E. Jackson, Columbia, U.S.N.M.

Bufo americanus, American Toad. Appears more common toward mountains. 2 from J. P. Barratt, Abbeville, in U.S.N.M.

Bufo fowleri, Fowler's Toad. 1 specimen from A. L. Pickens, Greenville, placed in U.S.N.M.; is pronounced "fairly typical," but another is intermediate with *B. americana* and another with *B. terrestris*.

Bufo terrestris, Southern Toad. 4 from Charlotte Paine, Anderson, in U.S.N.M.

Acris gryllus, Cricket Frog. 2, one of each color phase, from A. L. Pickens, Greenville, in U.S.N.M.

Pseudacris feriarum (?) Swamp Cricket Frog. Recorded in list of preserved specimens by Mr. E. R. Blake of Greenwood and Clinton.

Pseudacris nigrita, Swamp Cricket Frog. Specimens from A. L. Pickens, Greenville, are indefinitely intergraded with some other forms. To me some appear to have inclination toward *P. triseriata*, others, perhaps, toward *P. feriarum*. The more typical form seems to appear in the lower Piedmont.

Hyla andersonii, Anderson Hyla. Credit for collecting the type specimen seems to belong to Miss Charlotte Paine of Anderson, and there is no record from the Piedmont since this one described by S. F. Baird.

Hyla crucifer, Spring Peeper. From J. P. Barratt, Abbeville, U.N.S.M.

Hyla versicolor, Rain Toad. From Miss Charlotte Paine, Anderson, U.S.N.M.

Rana catesbeiana, Bull Frog. Recorded in list of Mr. E. R. Blake, Greenwood and Clinton.

Rana clamitans, Green Frog. 4 from Miss Charlotte Paine, Anderson, in U.S.N.M.

Rana pipiens, Leopard Frog. From A. L. Pickens, Greenville in U.S.N.M.

Rana sphenocephala, Southern Leopard Frog. From A. L. Pickens, Greenville, in U.S.N.M. Puzzling intergradations occur with *R. pipiens* and I have found a male with the *sphenocephala* markings mated with a

female of *pipiens*. The occurrence of the southern form here at about 1000 feet is an altitudinal record.

Rana sylvatica, Wood Frog. From Miss Charlotte Paine, Anderson, in U.S.N.M.

This leaves a number of salamanders and some frogs that undoubtedly occur in upper South Carolina still to be collected. Lack of records of the Pickerel Frog, and of the Green Hyla seems strange in view of the locality. I am greatly indebted to Miss Doris Cochran, Dr. E. R. Dunn, and Dr. L. Stejneger for identifying a number of difficult species and aiding me otherwise.

Greenville, S. C.

A. L. PICKENS

REPTILES OF UPPER SOUTH CAROLINA

In attempting a survey of the reptiles of upper South Carolina, I met with a better response than in the work with amphibians. This is to be expected, as the study of salamanders and toads often gives rise to difficulties that puzzle even professionals, and may well puzzle and too often discourage the beginner. As with the amphibians I have tried to give authority from typically hill or mountain localities where possible rather than from places doubtfully near the coast plain, and with respect for priority finds influenced thereby.

Anolis carolinensis, Green Lizard. 3 from Mrs. M. E. Daniel, Anderson. U.S.N.M. This Austroriparian form ranges into the very shadow of the mountains.

Sceloporus undulatus, Gray Lizard. From J. R. Nowell, Anderson. U.S.N.M.

Ophisaurus ventralis, Glass Snake. From Grady Southern, Greenville Co. A picture of this specimen appears in Nature Magazine, June, 1927.

Cnemidophorus sexlineatus, Sand Lizard. E. R. Blake List, Greenwood and Clinton.

Leiolopisma laterale, Ground Skink. 3 from Maj. M. E. Daniel, Anderson. U.S.N.M.

Eumeces fasciatus, "Scorpion" Skink. Specimens from Anderson, Abbeville, and Columbia in U.S.N.M.

Carpophis amoena, Worm Snake. From Mrs. M. E. Daniel, Anderson. U.S.N.M.

Abastor erythrogrammus, Rainbow Snake. From Dr. Wurdeman, Greenville; v. Holbrook.

Farancia abacura, Mud Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Diadophis punctatus, Ring-neck Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Diadophis punctatus edwardsii, Ring-neck Snake. From A. L. Pickens, Greenville. U.S.N.M.

Heterodon contortix, Spreading Adder. 3 from Anderson in U.S.N.M., also black phase from Mrs. M. E. Daniel, Anderson, and Dr. J. P. Barratt, Abbeville.

Heterodon simus, Hog-nose Adder. From Dr. J. P. Barratt, Abbeville. U.S.N.M.

Opheodrys aestivus, Rough Green Snake. 1 from Anderson. U.S.N.M.

Coluber constrictor, Black Snake. 4 from Miss Charlotte Paine, Anderson Co. U.S.N.M.

Coluber flagellum, Coach Whip. From J. R. Nowell, Anderson. U.S.N.M.

Elaphe obsoleta confinis, Spotted Gray Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Pituophis melanoleucus, Pine Snake. A splendid specimen from Pickens Co., kept in the fire-department of Greenville, has been photographed in motion pictures by Mr. W. Coxe and myself.

Lampropeltis getulus, King-Snake. Specimens from Anderson in U.S.N.M.

Lampropeltis rhombomaculata, Mole Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Lampropeltis triangulum syspila, House King-Snake. From Abbeville, in U.S.N.M.

Gempohora coccinea, Scarlet Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Natrix septemvittata, Queen Snake. From Mrs. M. E. Daniel, Anderson. U.S.N.M.

Natrix sipedon, Water Snake. From A. L. Pickens, Greenville. Private collection.

Natrix sipedon fasciata, Water Snake. From J. R. Nowell, Anderson. U.S.N.M.

Seminatrix pygaea, Florida Water Snake. From Prof. J. D. Corrington, Columbia; v. Copeia, No. 161.

Storeria dekayi, Dekay's Snake. From A. L. Pickens, Greenville. Private Collection.

Storeria occipito-maculata, Red-bellied Snake. 2 from Mrs. M. E. Daniel, Anderson, in U.S.N.M. A slate-blue, yellow-bellied example from Miss Charlotte Paine, Anderson, in the U.S.N.M.

Virginia valeriae, Valeria's Snake. From Miss Charlotte Paine, Anderson. U.S.N.M.

Thamnophis sauritus, Ribbon Snake. E. R. Blake List. Greenwood and Clinton.

Thamnophis sirtalis, Garter Snake. E. R. Blake List. Greenwood and Clinton.

Agkistrodon mokasen, Copperhead. Ellison-Smith Collection. Greenville.

Sistrurus miliarius, Ground Rattler. A specimen from Limestone Springs, Cherokee Co., in U.S.N.M.

Crotalus horridus, Common Rattle-snake. From A. L. Pickens, Little Rich Mountain. Private Collection.

Sternotherus odoratus, Musk Turtle. E. R. Blake List. Greenwood and Clinton.

Kinosternon subrubrum, Mud Turtle. From A. L. Pickens, Greenville. U.S.N.M.

Chelydra serpentina, Snapping Turtle. Common. Three-and-Twenty Mile creek; W. O. Pepper, of Easley.

Terrapene carolina, Box Turtle. From A. L. Pickens, Greenville. Private Collection.

Chrysemys picta, Painted Turtle. E. R. Blake List. Greenwood and Clinton.

Pseudemys concinna, Broad Cooter. In the Savannah and Congaree above the fall-line, according to Holbrook.

Pseudemys rubriventris, Red-bellied Cooter. E. R. Blake List. Greenwood and Clinton.

Gopherus polyphemus, Gopher Turtle. Holbrook records this from "Edgefield" but probably refers to the parts of the county below the fall line, since cut off into Aiken Co.

Amyda ferox, Southern Soft-Shelled Turtle. Specimen from Barratt Collection, in U.S.N.M.

Amyda spinifer, Spiny Soft-shelled Turtle. A single example from Abbeville in U.S.N.M.

In 1851 Dr. W. I. Burnett of Aiken, presented the Boston Society of Natural History with a specimen of *Elaps fulvius* and described it as rare at that place which is a few miles below the fall line. This is the nearest record I can find. Mr. E. R. Blake states that *Agkistrodon contortrix* is found in the middle Saluda valley. I am indebted to Dr. L. Stejneger, Miss Doris Cochran, Prof. J. D. Corrington, Prof. Franklin Sherman, Messrs. E. R. Blake, Robert Ellison, Jerry Smith, and others for valuable assistance in the work incident to the preparation of the above list, and to the U. S. National Museum, Boston Society of Natural History, and the Charleston Museum for courtesies extended.

A. L. PICKENS

Greenville, S. C.

CROTAPHYTUS COLLARIS COLLARIS
AT TAYLOR TOWN, LOUISIANA

Say's Collared Lizard is not supposed to be found in North Louisiana. During the month of June, 1925, a negro boy brought to me a box containing a fine specimen of *Crotaphytus collaris collaris* (Say) which he himself had collected near a gas well at Taylor Town, La. I circulated inquiries in all parts of the parish expecting to be informed that some person had transported the animal from Arkansas or Texas. However this information failed to materialize. It is possible that it could have come into the parish in some oil well pipe that was piled very near to the spot where the specimen was found. Stejneger and Barbour's

Check List, 2nd edition, gives the range of this species as follows: "Arkansas south to middle-western and northwestern Texas and west to eastern New Mexico." In a list of Reptiles and Amphibians from the vicinity of Imboden, Arkansas, furnished me by Mr. Byron C. Marshall, this species is listed as being very rare. I would greatly appreciate any one giving me a record of the occurrence of Say's Collared Lizard in any part of Louisiana.

L. S. FRIERSON, JR.

Shreveport, La.

PHRYNOSOMA CORNUTUM (HARLAN)
IN LOUISIANA

In the contributions from Baylor University dated May 15, 1926, under the heading of "The Herpetology of Caddo and De Soto Parishes, Louisiana," I listed *Phrynosoma cornutum* (Harlan) as introduced, due to a single specimen collected in the vicinity of Forbing, Louisiana, Caddo Parish. Mr. Bloxum, a resident of Forbing, informed me that during the summer of 1918 he brought back from central Texas several of these little horned-toads and liberated them on a high sandy hill near his home. Later during the summer of 1925 a single example was collected on a sandbar near a cut-off of Red River a mile southeast of my home at Gayle, Louisiana, Caddo Parish. On August 5, 1927, I collected a specimen near the home of Mr. E. R. Mading, located at 525 Wall St., Shreveport Louisiana. These three specimens are the results of several years of collecting. I was doubtful of the status of the first specimen collected as being a native of the state. Since the additional specimens were collected in widely separated parts I am convinced that they are reproducing in isolated sandy localities in North Louisiana.

L. S. FRIERSON, JR.

Shreveport, La.

CROCODILES

If one does not deliberately study these creatures they are certain, if one stays in Africa long enough, to thrust themselves on one's attention. They are omnipresent. Every lagoon, stream, large pan or river contains crocodiles.

When trapping, crocodiles become a great nuisance. They will travel long distances overland and along streams and are continually getting into traps as to almost eliminate the possibility of catching anything else.

Two crocodiles which were so caught I tried to keep alive. But in each instance the leg which had been held in the steel jaws festered so that the reptile died. This forced upon my attention the fact that crocodiles cannot care for their wounds. Unless a wounded crocodile can reach running water I doubt if it can survive.

One evening while camped near a small pool I was fortunate enough to find and be able to watch a crocodile fishing. The pool was alive with fish of all kinds and sizes. The crocodile would disappear under water for a minute and then its jaws and head reappeared. Each time it had a fish cross wise. With two or three little jerks it turned the fish parallel with its jaws and then gulped it down.

The crocodile knew that I was watching it but the fishing was so good it would not leave. It was nervous about my presence but in spite of this it stuck its head out to swallow its fish. This leads me to believe that crocodiles cannot swallow under water. I am not certain that this is true as the formation of the gullet and throat would lead one to expect that they could do so.

Somewhere I encountered the statement that there are no crocodiles in Africa larger than fourteen feet. I shot one on the Kafue which measured by steel tape just a fraction larger than seventeen feet five inches. This one was very old and the stomach con-

tained a double handful of shell head ornaments, brass and iron bracelets and wire anklets.

Crocodiles undoubtedly kill more game than any other single species of predatory creature. They also kill more human beings. Their speed in the water is remarkable and the strength of a blow from the tail is tremendous.

The majority of the animals killed by crocodiles are secured when they approach water. Contrary to general belief, crocodiles do not first seize their prey but rather knock it into the water by a lightning fast blow from the tail. The animal is then grasped in the jaws and drowned. Once dead the carcase is taken to an underwater shelf or hole and there left to decompose. It is essential to the crocodile method of feeding that its meat be rotten and decomposed. Unlike the lion or other carnivorous animals crocodiles cannot rend or tear as their feet are not adapted for such work nor are their jaws and teeth.

WYNANT DAVIS HUBBARD

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New York City.

BREWER'S MOLE AS FOOD OF THE BULLFROG

The stomach of a fourteen ounce Bullfrog, *Rana catesbeiana* Shaw collected August 17, 1927 at Burden Lake, Rensselaer County, N. Y., contained an adult specimen of Brewer's mole, *Parascalops breweri* (Bachman). The mole was preserved and identified at the New York State Museum.

JOHN A. HELLER
Rensselaer, New York.

COPEIA is the Journal of the American Society of Ichthyologists and Herpetologists. Subscription for 1927, \$1.00; 25 cents per copy. Dues to the Society, \$2.00 a year, including subscription to *Copeia*.

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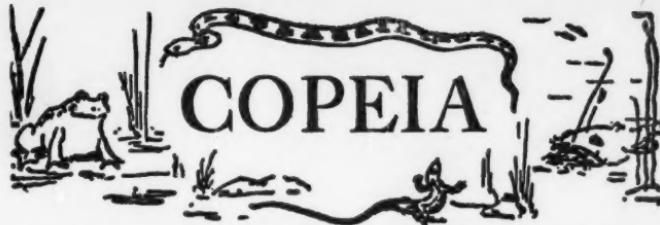
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